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(54) **Assembly for a roof fan**

(57) The present invention relates to an assembly for a roof fan, comprising a support which can be mounted with a roof upstand on a roof, an upright support which can be mounted on the support, and a motor/fan combination for drawing in ventilating air, wherein the

support is formed by three support legs mounted on the support in the corners of an imaginary triangle; and the motor/fan combination can be stabilized on the three support legs. The invention also relates to a support leg and bracket evidently intended for the assembly.

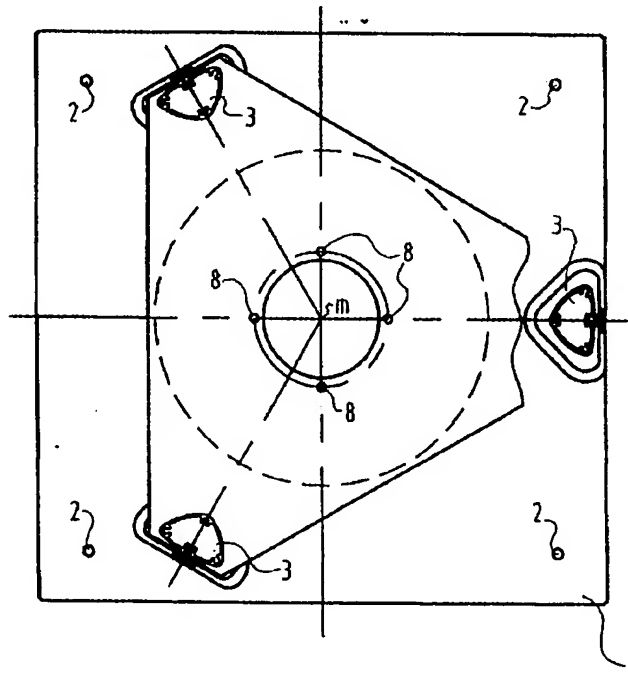


FIG. 1

EP 1 120 610 A2

Description

[0001] The present invention relates to an assembly for a roof fan.

[0002] Fans for discharging inside air are applied on a large scale. Such fans are often placed on a flat or sloping roof wherein the inside air is blown out upward, i.e. in vertical direction, or sideways, i.e. in horizontal direction. To draw in inside air use is made of a fan driven by an electric motor, also referred to as a motor/fan combination, which can be mounted on the roof using a support. Also arranged on the support is the fan casing which protects the motor/fan combination against (weather) influences from outside and which ensures a correct guiding of the airflows.

[0003] An upright support is known consisting of a large number of separate components on which the motor/fan combination can be mounted. A drawback of such a support is that a correct alignment of the motor/fan combination is difficult to realize, with the result that the assembly must be readjusted later. The fitting time is moreover relatively long due to the large number of components required for fitting of the assembly. The known support has the further drawback that for each type of motor/fan combination, i.e. for each motor/fan combination of a determined form, weight, outlet direction, capacity and so on, a separate support has to be designed, which entails further cost.

[0004] It is the object of the present invention to obviate such drawbacks and to provide an improved and universally applicable assembly for a roof fan.

[0005] According to the present invention the assembly has the feature that it is formed by three support legs mounted on the support in the corners of an imaginary triangle and that the motor/fan combination can be stabilized on the three support legs. Readjustment of the motor/fan combination can be made unnecessary by securing the motor/fan combination at three points. Rapid fitting is furthermore possible due to the small number of components.

[0006] According to the preferred embodiment the support legs are provided with a channel extending in height direction for receiving fixing means of a fan for fixing a fan casing. The fan casing can be fixed quickly and simply to the three legs without special tools being required herein. The positioning of the fan casing does not represent any further problem since the channel for receiving the fixing means of the casing extends in height direction. Such a channel further provides universal applicability of the support legs on a large number of types of fan casing.

[0007] According to a further preferred embodiment the channel is provided with screw thread and the fixing means comprise one or more fixing parts provided with screw thread, and the three support legs are preferably formed by dividing a single elongate profile into three parts. By sawing or cutting through the elongate profile, which is manufactured using an extrusion technique, at

suitable distances, three parts (support legs) with the same form are provided, the length of which can be adjusted to the situation on-site or to the motor/fan combination being applied. The support legs can be manufactured in very efficient manner by making the profiles with the above stated extrusion technique.

[0008] According to a further preferred embodiment the profile has a closed form in cross-section, which provides a relatively large maximum permissible load.

[0009] According to a further preferred embodiment this form is curved in order to reduce the air resistance of the air flowing along the support legs. Owing to the reduced air resistance a smaller and lighter motor/fan combination can be applied.

[0010] According to a further preferred embodiment one or more receiving parts are provided close to the upper end of a support leg for receiving one or more self-tapping fastening bolts of the motor/fan combination. The motor/fan combination can hereby be fixed to the legs in simple and rapid manner.

[0011] According to a further preferred embodiment the channel and/or the receiving part extend along the whole height of the support leg. This means not only that the fixing of the fan casing can take place along the whole length of the support leg, whereby a greater freedom of action is provided for the fitter, but also that the profile can be manufactured inexpensively by means of an extrusion process. Long profiles (of about 6 metres profile length) are herein supplied, wherein support legs of desired length can be realized simply and quickly by sawing of the profiles. It is moreover possible to dispense with additional manufacturing processes, such as for instance arranging openings for receiving fastening bolts and the like.

[0012] According to a further preferred embodiment a fan casing is arranged on the radially outward directed side of the support legs, preferably by arranging a bolt in the above mentioned longitudinal channel of each of the support legs. In order to provide a casing which can be produced efficiently and simply, this casing is constructed from two substantially three-sided parts which can be fixed together to form a hexagonal casing round the three support points. The three-sided part is herein preferably manufactured integrally from a twice bent plate-like part. The plate-like part can be formed by an aluminium plate, for instance in the case of a vertically blowing fan, or formed by a wire grid in the case of a horizontally blowing fan. The casing can be manufactured simply and quickly by embodying it as plates (bent a number of times).

[0013] According to a further preferred embodiment of the invention, the assembly comprises one or more brackets for fixing a wire grid of the appropriate mesh width to support legs, wherein the bracket comprises:

- a body;
- a first recess in the body for receiving a wire of the wire grid;

- a second recess and a third recess in the body for receiving an adjacent wire of the wire grid, wherein the intermediate distance between the first and second recess respectively the first and third recess corresponds with a first and a second mesh width.

[0014] A wire grid of a different mesh width is applied subject to the requirements of the client or of the applied motor/fan combination. The bracket according to the present invention provides a simple fixing of the wire grid to the support legs, which fixing is also universally applicable for wire grids of different mesh widths.

[0015] Further advantages, features and details of the present invention will be elucidated on the basis of the description of a preferred embodiment thereof. Reference is made in the description to the annexed figures, in which:

Figure 1 shows a schematic view of the basic construction of a preferred embodiment according to the invention;

Figure 2 shows a schematic side view of the basic construction of figure 1;

Figures 3a, 3b and 3c show respectively a partly cut-away view in perspective, a partly cut-away top view and a partly cut-away side view of a horizontally blowing roof fan;

Figures 4a, 4b and 4c show respectively a partly cut-away view in perspective, a partly cut-away top view and a partly cut-away side view of a vertically blowing roof fan as preferred embodiment of the invention;

Figure 5 is a view of a support leg according to a preferred embodiment thereof;

Figure 6 is a view of a preferred embodiment of the bracket for fixing the wire grid; and

Figure 7 is a partly cut-away perspective view of an acoustically insulated roof fan.

[0016] Referring to figure 1, a support plate 1 is mounted on a flat roof (not shown) using bolts 2. Support plate 1 is provided with an inlet cone 7 for guiding the air flowing upward from below. Three support legs 3 are fixed onto the support plate, thus such that each of these is positioned at one of the corner points of an imaginary triangle, wherein the centre m of the triangle corresponds with the rotation axis of the motor/fan combination.

[0017] At the position of the locations at which the flat undersides 18 of legs 3 are placed, support plate 1 is provided with recessed portions 17 so that using bolts 19 the supports 3 can be fixed in stable manner relative to the support plate. By providing support plate 1 with recessed portions 17 space is created in which the bolt heads 19 protruding on the underside of support legs 3 can be received, thus providing the possibility of exact positioning and stabilizing.

[0018] Arranged on top of the support legs is a motor

plate 4 on which an electric motor 5 is placed using bolts 8. This electric motor drives a fan 6 with which air is drawn in. Motor 5 is preferably of the external pole type. In this case the rotor rotates round an internal stator provided with windings. The motors are low-noise and maintenance-free through the use of groove ball bearings closed on two sides and using special grease lubricant. Such external pole motors provide possibilities for compact construction of the roof fans, a direct coupling of motor and fan, without additional components, a good speed regulation with stepping or modulating control on the basis of variation in voltage, an optimum balancing of all rotating parts as a unit and a relatively smooth starting operation with relatively low starting currents.

[0019] Figures 3a to 3c show a preferred embodiment of a fan in which air is drawn in from below (arrow A) and discharged sideways (arrow B) to the outside (arrow C) via a wire grid 11. In figures 4a to 4c is shown a roof fan wherein the Indrawn air (arrow A) is guided upward (arrow B) via a grid 15 into the outside air (arrow D).

[0020] In the embodiment shown in figures 3a to 3c a hood 10 is fixed to each of the support legs 3 using a connecting piece 12. In order to comply with machine guidelines and to prevent dirt, leaves, and so on entering the fan, a wire grid 11 is provided. Wire grid 11 is fixed to support legs 3 in a manner as described below.

[0021] In figures 4a to 4c a tunnel 13 is fixed to support legs 3 using a number of bolts 14, while in this case the upper side of the roof fan is protected using a wire grid 15 embodied in accordance with machine guidelines. Both tunnel 13 and wire grid 11/15 are each constructed from two parts.

[0022] Figure 5 shows a preferred embodiment of a support leg 3. A significant advantage of this embodiment of support leg 3 is that it can be manufactured simply and inexpensively by extrusion techniques. The profile is supplied in long lengths. The profile is sawn into parts of suitable length on-site.

[0023] As will be apparent from the following, the diverse components can be fixed to support leg 3 without using special tools. All fixing options are incorporated in the special construction of the support leg, wherein the leg nevertheless remains simple to manufacture.

[0024] For the mounting of casings, such as wire grid 11, or a hood 10 and tunnel 13 and the like, the support is provided in longitudinal direction with a channel 33, the inner wall of which is provided with screw thread 35. Screws, such as for instance bolts 14 for fastening a tunnel 13 and bolts 46 for fastening a wire grid bracket 40, can be screwed into this screw thread 35. Since channel 33 is provided along the whole height of support 3, the bolts can be tightened at any desired position in height direction. This not only means a simple fitting, it also provides improved possibilities for alignment of the assembly.

[0025] Channel 33 is also provided with stop surfaces 34 to further increase the stability of the connection between support leg 3 and the fixed component.

[0026] Figure 5 shows that a support leg 3 is manufactured as a profile with a closed cross-section. This means that the profile can withstand a relatively heavy load. On the inside of the profile lips 36 and 37 are provided along the whole height which form respective openings on the end surface of profile 3. Into these openings can be tightened self-tapping bolts with which motor plate 4 of the motor/fan combination can be fixed.

[0027] Figure 6 shows the wire grid bracket 40 with which a wire grid 11 can be fixed to support legs 3. In order to enable a universal fixing of the wire grid, i.e. a fixing which is suitable for diverse mesh widths, the body 41 of the bracket is provided with a first recess, in which the first wire of the wire grid can be received, in addition to second respectively third recesses 43 and 44 in which an adjacent wire of the wire grid is received in accordance with the mesh width of the wire grid. In the case of small mesh widths, recesses 42 and 43 serve to receive adjacent wires of the wire grid, while in the case of larger mesh widths recesses 42 and 44 fulfill this function. Through an opening 45 arranged in body 41 can be inserted a bolt (not shown) which can be tightened in channel 33 of support leg 3.

[0028] In the shown embodiment the bracket has a convex form, in this case of about 0.2 mm. This has the purpose, as a result of the elastic properties of body 41, of pressing the bracket 40 firmly against the wire ends. In the shown embodiment the bracket 40 is manufactured from a plastic and strengthened with glass fibre.

[0029] In figure 7 is shown an acoustically insulated version of a vertically blowing roof fan. In this fan air is drawn in (arrow A) and guided along a number of sound-insulating cassettes (arrow B) and then discharged vertically upward (arrow E). In this embodiment is arranged an outer cassette 25 which is manufactured from a plate 27 and a perforated plate 26 mounted thereon on the inside. Acoustically absorbent material, preferably rockwool, is arranged in the space between perforated plate 26 and plate 27. An inner cassette 20 is likewise provided, wherein absorbent material, preferably in the form of rockwool 22, is arranged between an inner wall and a perforated outer wall 23. Since the sound is propagated spherically between the two perforated plates 26 and 23, it will be absorbed in large part by absorbent material 22.

[0030] Acoustically absorbing roof fans are per se already known. The cassettes are also simple to mount as extension, for instance in existing roof fans already fitted in the past.

[0031] The present invention is not limited to the above described preferred embodiments. The rights sought are defined rather by the following claims, within the scope of which many modifications can be envisaged.

Claims

1. Assembly for a roof fan, comprising:

- a support which can be mounted with a roof upstand on a roof;
- an upright support which can be mounted on the support;
- a motor/fan combination for drawing in ventilating air;

characterized in that the support is formed by three support legs mounted on the support in the corners of an imaginary triangle; and the motor/fan combination can be stabilized on the three support legs.

2. Assembly as claimed in claim 1, wherein the support legs are provided with a channel extending in height direction for receiving fixing means of a fan casing.

3. Assembly as claimed in claim 2, wherein the channel is provided along the length with screw thread and the fixing means comprise one or more fixing parts provided with screw thread.

4. Assembly as claimed in claim 1, wherein the three support legs are formed by dividing a single elongate profile into three parts.

5. Assembly as claimed in claim 4, wherein the profile has a closed form in cross-section.

6. Assembly as claimed in claim 5, wherein the form is curved in order to reduce the air resistance.

7. Assembly as claimed in any of the foregoing claims, wherein one or more receiving parts are provided close to the upper end of a support leg for receiving one or more self-tapping fastening bolts of the motor/fan combination.

8. Assembly as claimed in claim 7, wherein a receiving part comprises one or more lips running along the inner side of the profile wall.

9. Assembly as claimed in any of the foregoing claims, wherein the channel and/or the receiving part extend along the whole height of the support leg.

10. Assembly as claimed in claim 1, wherein a casing is arranged on the radially outward directed sides of the support legs.

11. Assembly as claimed in claim 10, wherein a support leg comprises one or more stop surfaces for the casing which are provided on either side of the

channel.

12. Assembly as claimed in claim 10 or 11, wherein the casing is constructed from two substantially three-sided parts which can be fixed together to form a hexagonal casing round the three support legs. 5
13. Assembly as claimed in claim 12, wherein a three-sided part is manufactured integrally from a twice bent plate-like part. 10
14. Assembly as claimed in claim 13, wherein the plate-like part is formed by an aluminium plate.
15. Assembly as claimed in claim 13, wherein the plate-like part is formed by a wire grid. 15
16. Assembly as claimed in any of the foregoing claims, wherein the support comprises one or more recessed portions. 20
17. Assembly as claimed in any at least one of the foregoing claims, comprising one or more brackets for fixing a wire grid of an appropriate mesh width to the support legs, wherein the bracket comprises: 25
 - a body;
 - a first recess in the body for receiving a wire of the wire grid;
 - a second recess and a third recess in the body for receiving an adjacent wire of the wire grid, wherein the intermediate distance between the first and second recess respectively the first and third recess corresponds with a first and a second mesh width. 30 35
18. Assembly as claimed in claim 17, wherein the body of the bracket is provided with a convex form.
19. Assembly as claimed in claim 17, wherein the bracket is strengthened with glass fibre. 40
20. Assembly as claimed in claims 7 and 17, wherein the body is provided with an opening through which a bolt can be inserted to fasten the bracket in the channel of the support leg. 45
21. Support leg evidently intended for an assembly as claimed in any of the claims 1-20. 50
22. Bracket evidently intended for an assembly as claimed in claim 17, 18 or 19. 55

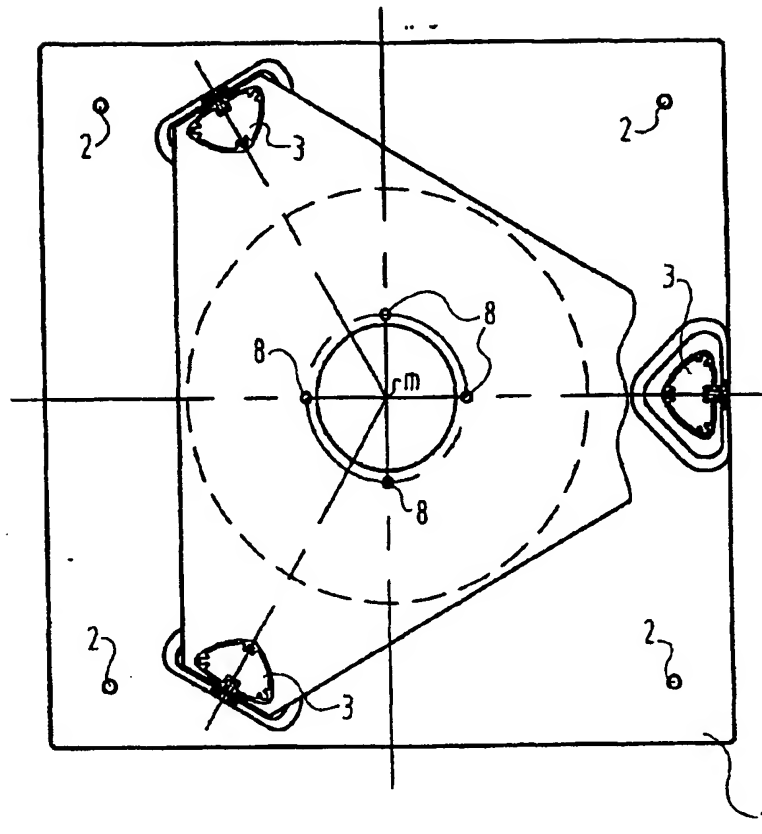


FIG. 1

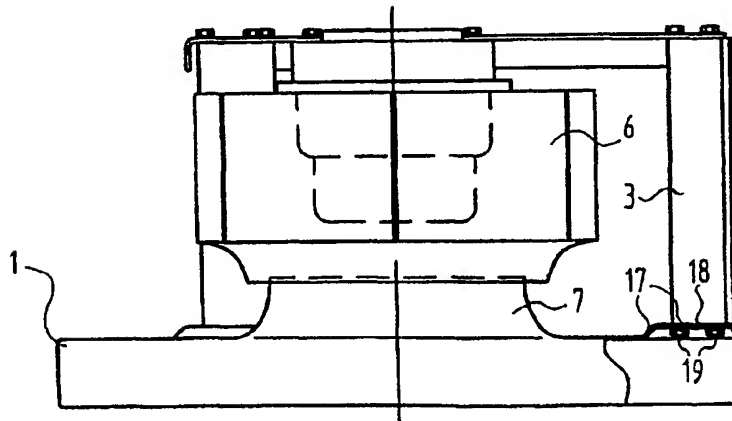


FIG. 2

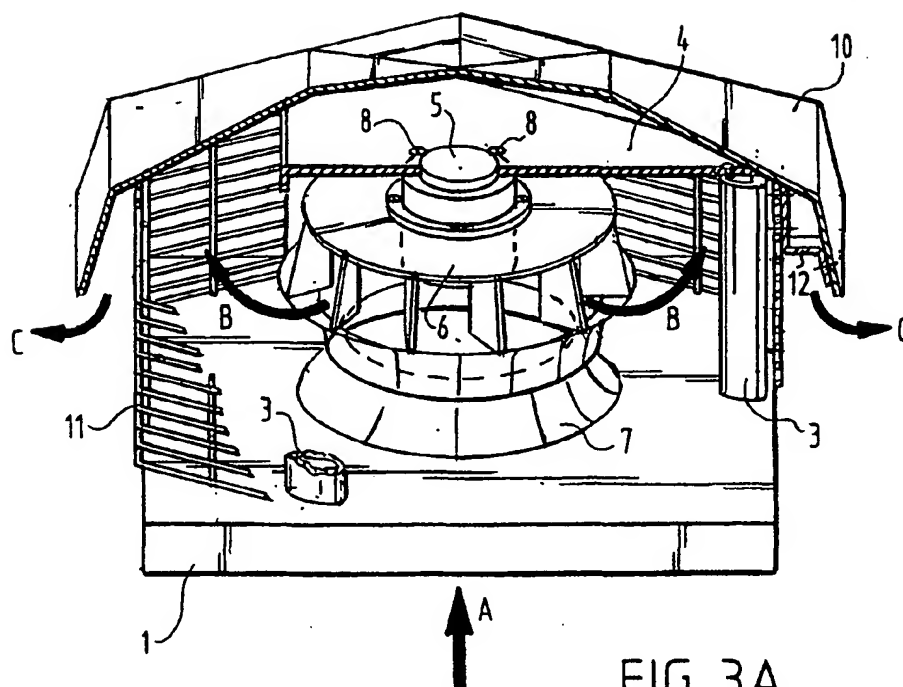


FIG. 3A

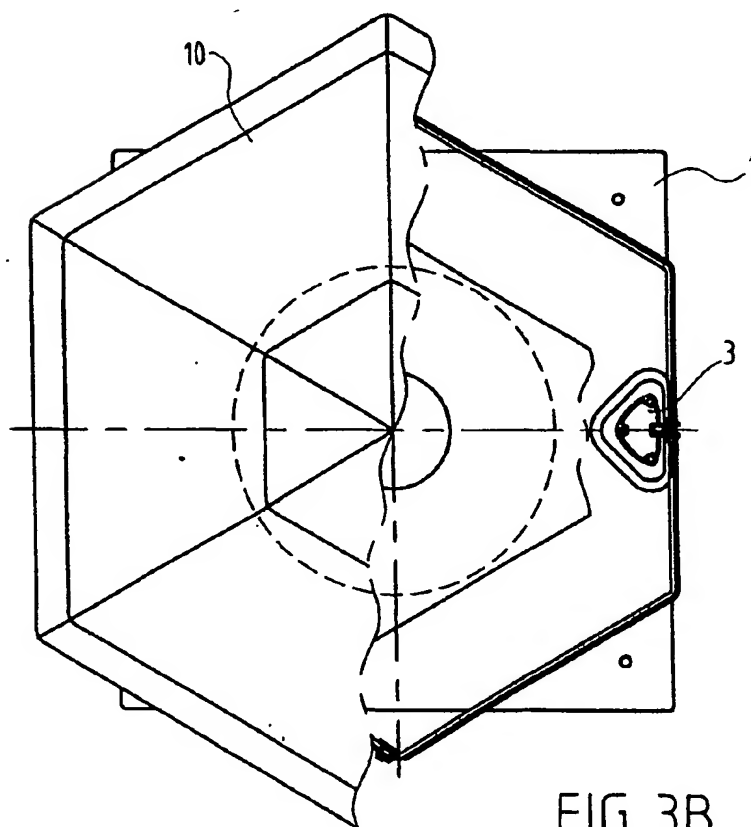


FIG. 3B

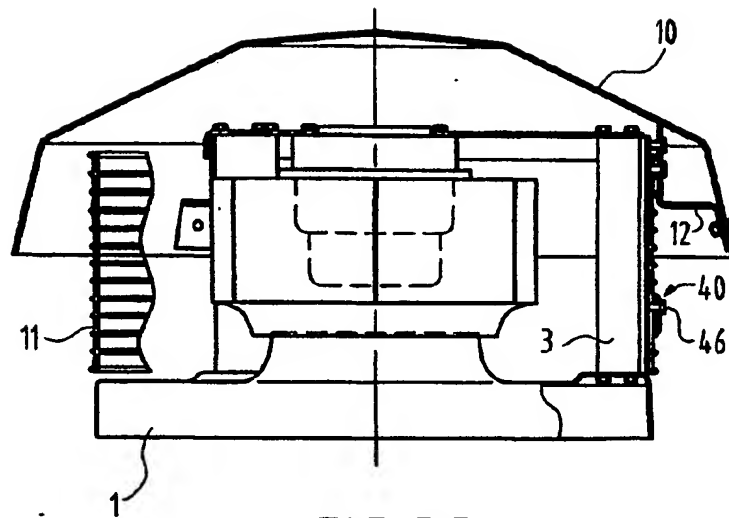


FIG. 3C

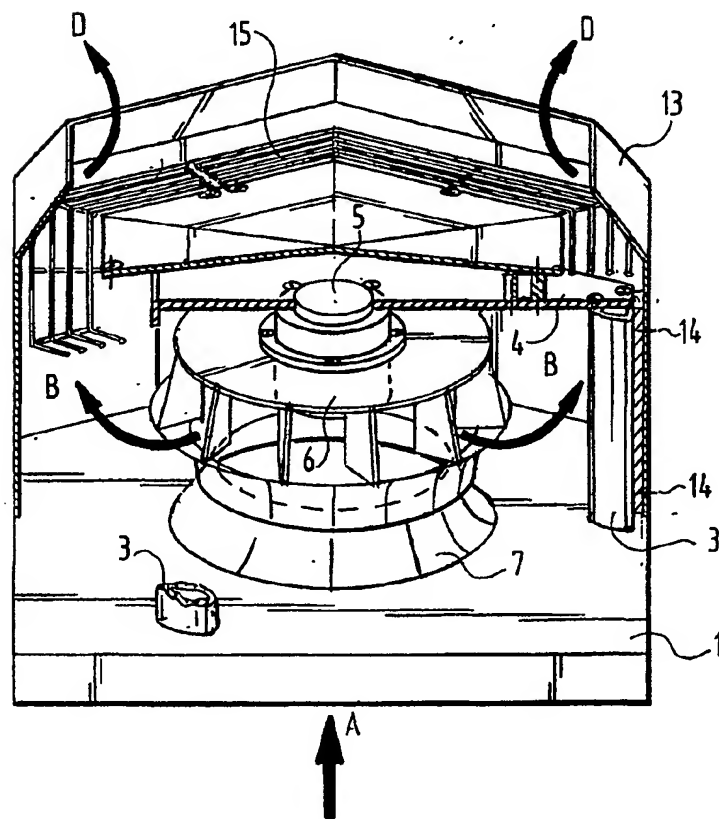


FIG. 4A

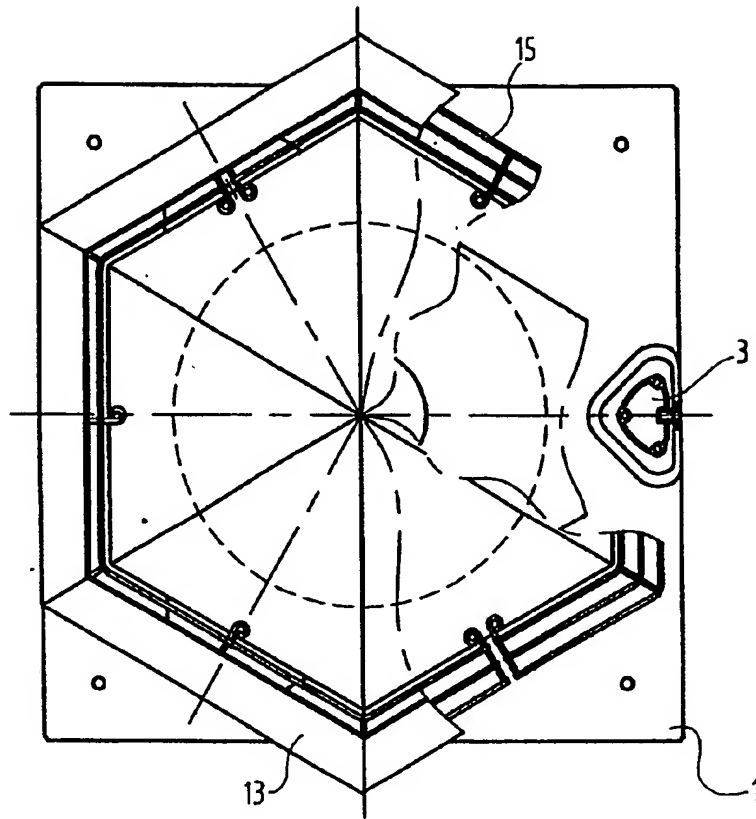


FIG. 4B

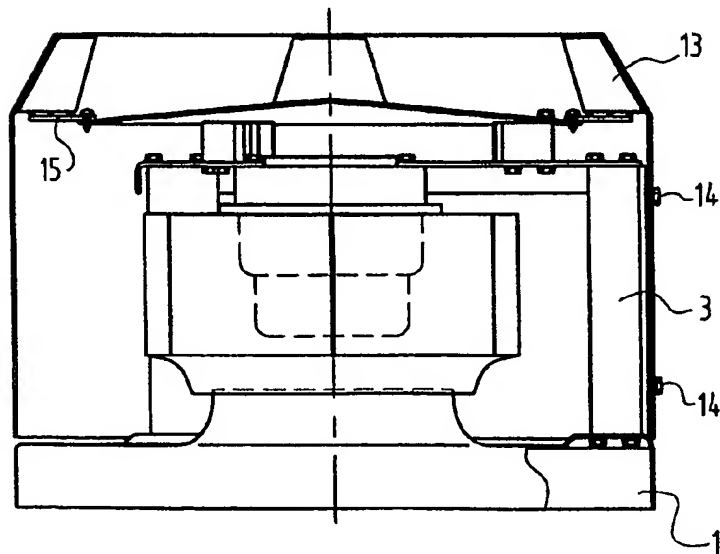


FIG. 4C

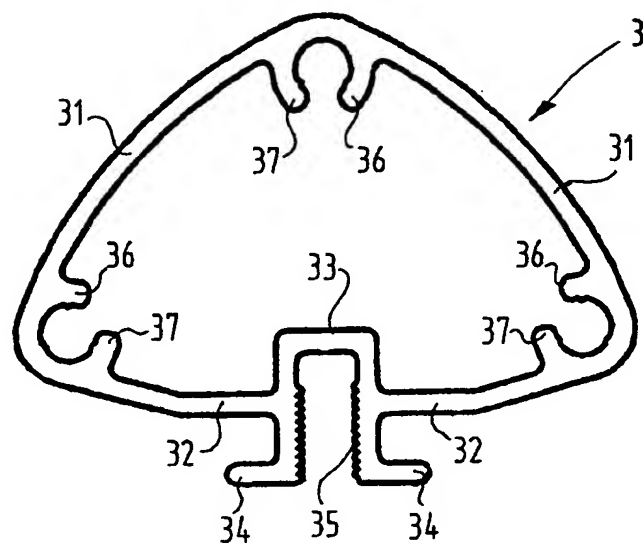


FIG. 5

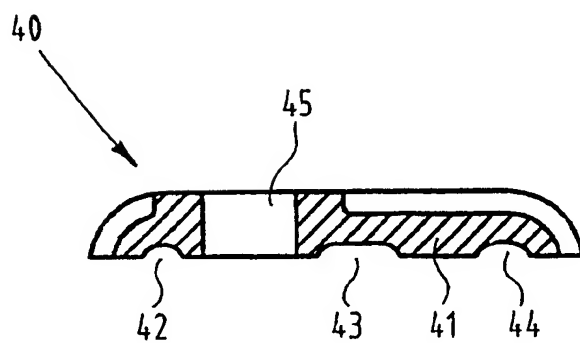


FIG. 6

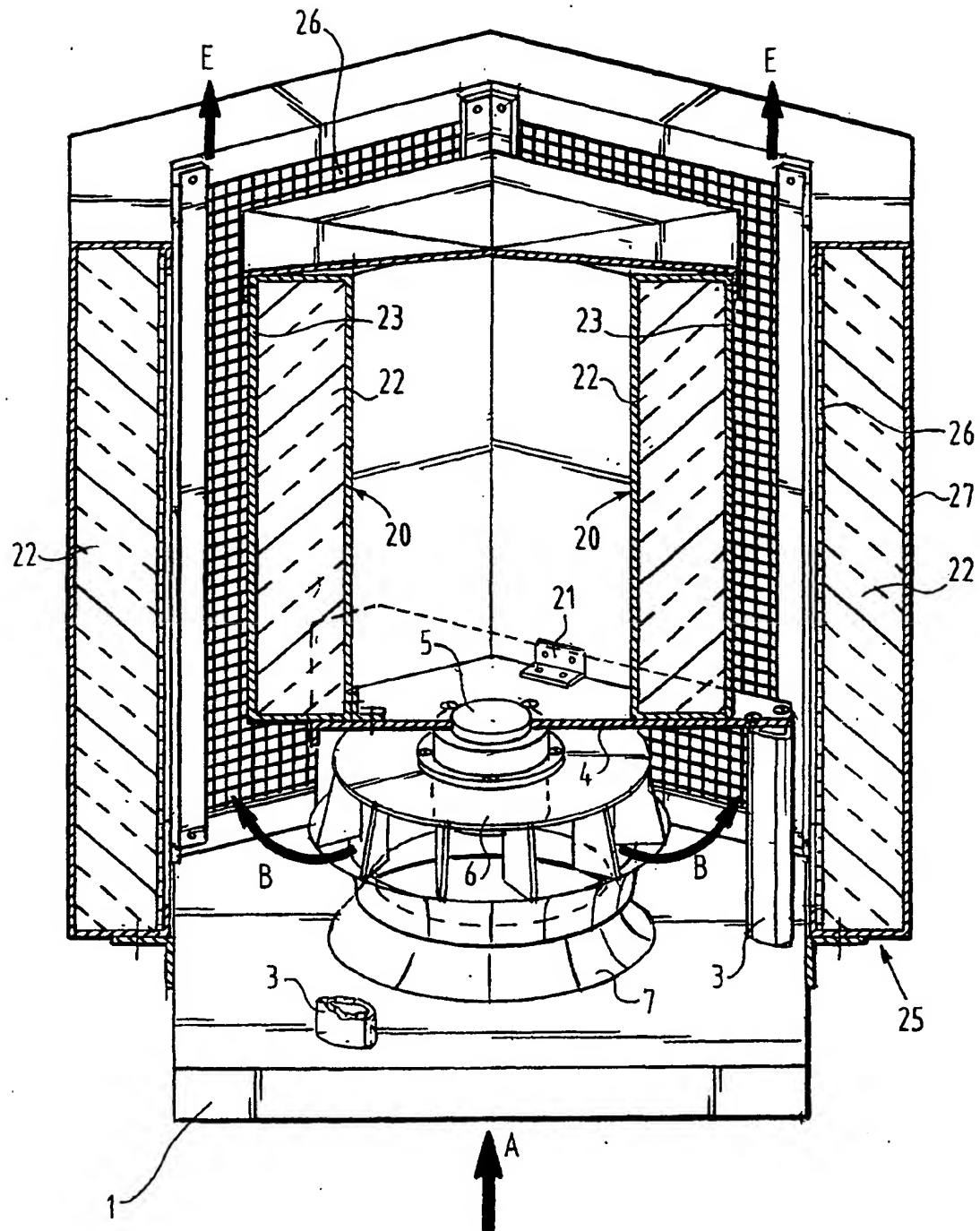


FIG. 7



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(54) **Assembly for a roof fan**

(57) The present invention relates to an assembly for a roof fan, comprising a support which can be mounted with a roof upstand on a roof, an upright support which can be mounted on the support, and a motor/fan combination for drawing in ventilating air, wherein the

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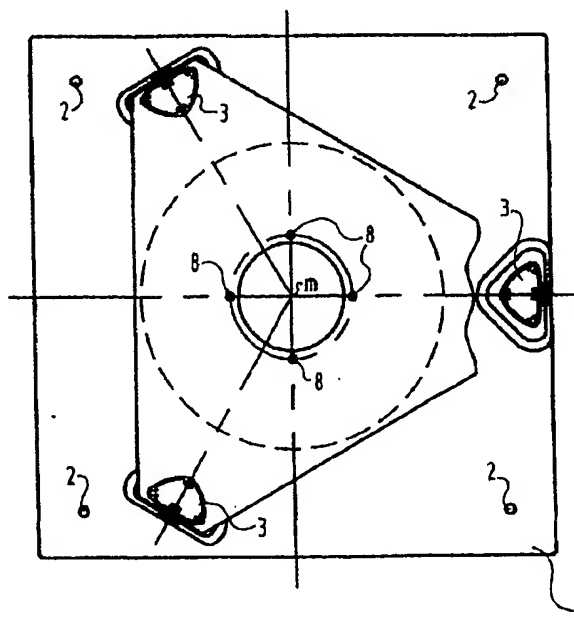


FIG. 1

EP 1 120 610 A3



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PARTIAL EUROPEAN SEARCH REPORT

Application Number

which under Rule 45 of the European Patent Convention EP 01 20 0316
shall be considered, for the purposes of subsequent
proceedings, as the European search report

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X	EP 0 641 972 A (AMPHOUX ANDRE) 8 March 1995 (1995-03-08) * abstract * * page 3, line 27 - line 29 * * claim 1 * * figures 1,3 *	1,16	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			F24F E04D
INCOMPLETE SEARCH <p>The Search Division considers that the present application, or one or more of its claims, does/do not comply with the EPC to such an extent that a meaningful search into the state of the art cannot be carried out, or can only be carried out partially, for these claims.</p> <p>Claims searched completely :</p> <p>Claims searched incompletely :</p> <p>Claims not searched :</p> <p>Reason for the limitation of the search see sheet C</p>			
Place of search MUNICH		Date of completion of the search 12 September 2002	Examiner Valenza, D
CATEGORY OF CITED DOCUMENTS <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1504 dated (10/04/01)



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**INCOMPLETE SEARCH
SHEET C**

Application Number
EP 01 20 0316

Claim(s) searched completely:
1-20

Claim(s) not searched:
21,22

Reason for the limitation of the search:

The subject-matter (the leg) of claim 21 is not defined in terms of technical features (EPC Rules 29, 45 and Art. 84), therefore a meaningful search is not possible.

The subject-matter (the bracket) of claim 22 is not defined in terms of technical features (EPC Rules 29, 45 and Art. 84), therefore a meaningful search is not possible.



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PARTIAL EUROPEAN SEARCH REPORT

Application Number

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EPO FORM 1503 03.02 (P4/C10)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 20 0316

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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EPO FORM P0453

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82